FORM PTO-1390 (Modified) (REV 11-2000) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER: **WE10032**

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR): 10/04774 8

INTERNATIONAL APPLICATION NO	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP00/07652	**8 August 2000 (08/08/2000)**	**21 August 1999 (21/08/1999)**

TITLE OF INVENTION

DEVICE FOR CONTINUOUSLY MELTING AND REFINING INORGANIC COMPOUNDS, ESPECIALLY GLASSES AND GLASS CERAMICS

APPLICANT(S) FOR DO/EO/US

SCHMIDBAUER, Wolfgang

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include itens (5), (6), (9) and (24) indicated below.
4. ☒ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
   a. ☒ is attached hereto (required only if not communicated by the International Bureau).
   b. ☐ has been communicated by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☒ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
   a. ☐ are attached hereto (required only if not communicated by the International Bureau).
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☒ A copy of the International Search Report (PCT/ISA/210).

Items 13 to 20 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
20. ☐ A second copy of the published international application under 35 U.S.C. 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
22. ☒ Certificate of Mailing by Express Mail
23. ☒ Other items or information:

Check No. 102864

JC13 Rec'd PCT/PTO 19 FEB 2002

U.S. APPLICATION NO (IF KNOWN, SEE 37 CFR)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
10/049948	PCT/EP00/07652	WEI0032

24. The following fees are submitted:.

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :

		CALCULATIONS PTO USE ONLY
☐	Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO	**$1040.00**
☒	International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO	**$890.00**
☐	International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO	**$740.00**
☐	International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4)	**$710.00**
☐	International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4)	**$100.00**

ENTER APPROPRIATE BASIC FEE AMOUNT = **$890.00**

Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)). **$0.00**

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	20 - 20 =	0	x $18.00	**$0.00**
Independent claims	1 - 3 =	0	x $84.00	**$0.00**
Multiple Dependent Claims **(check if applicable)**.			☐	**$0.00**

TOTAL OF ABOVE CALCULATIONS = **$890.00**

☐ Applicant claims small entity status. See 37 CFR 1.27). The fees indicated above are reduced by 1/2. **$0.00**

SUBTOTAL = **$890.00**

Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)). + **$0.00**

TOTAL NATIONAL FEE = **$890.00**

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) **(check if applicable).** ☐ **$0.00**

TOTAL FEES ENCLOSED = **$890.00**

Amount to be: refunded	$
charged	$

a. ☒ A check in the amount of **$890.00** to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **02-0385** A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

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JOHN F. HOFFMAN
NAME

26,280
REGISTRATION NUMBER

February 19, 2002
DATE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	)	
Wolfgang Schmidbauer et al.	)	Group:
Serial No.:	)	
Filed:	)	Examiner:
Title: DEVICE FOR CONTINUOUSLY MELTING	)	
AND REFINING INORGANIC COMPOUNDS,	)	
ESPECIALLY GLASSES AND GLASS CERAMICS	)	

PRELIMINARY AMENDMENT DELETING MULTIPLE DEPENDENT CLAIMS

Assistant Commissioner of Patents
Washington, DC 20231

Sir:

Prior to calculating the filing fee, please enter the following amendments to the application.

IN THE CLAIMS

In claim 3, line 1, delete "or 2".

In claim 5, line 1, delete "one of claims 1 to 4" and substitute therefor --claim 1--.

In claim 6, lines 1 and 2, delete "one of claims 1 to 5" and substitute therefor --claim 1--.

In claim 8, line 1, delete "one of the claims 6 or 7" and substitute therefor --claim 6--.

In claim 9, line 1, delete "one of the claims 6 to 8" and substitute therefor --claim 6--.

In claim 10, line 1, delete "one of the claims 6 to 9" and substitute therefor --claim 6--.

In claim 11, line 1, delete "one of the claims 6 to 10" and substitute therefor --claim 6--.

In claim 12, line 1, delete "one of the claims 5 to 11" and substitute therefor --claim 5--.

In claim 13, line 1, delete "one of the claims 5 to 12" and substitute therefor --claim 5--.

In claim 14, line 1, delete "one of the claims 5 to 13" and substitute therefor --claim 5--.

In claim 15, line 1, delete "one of the claims 5 to 14" and substitute therefor --claim 5--.

Please add the following new claims:

--16. An apparatus as claimed in claim 2, characterized in that a cooling groove (4) is provided downstream of the refining vessel (3).

17. An apparatus as claimed in claim 2, characterized in that the melting vessel (1) and/or refining vessel (3) are disposed within a conductive screening cage.

18. An apparatus as claimed in claim 3, characterized in that the melting vessel (1) and/or refining vessel (3) are disposed within a conductive screening cage.

19. An apparatus as claimed in claim 4, characterized in that the melting vessel (1) and/or refining vessel (3) are disposed within a conductive screening cage.

20. A method of operation in an apparatus as claimed in claimed 2, characterized in that the melt is supplied continuously from the melting vessel (1) from below to the refining vessel (3) and flows in the upper zone via a cooling groove (4) to a stirring crucible (6).--

Respectfully submitted,

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Date: February 19, 2002

FWIMAN1 221537v1

1/PRTS

An apparatus for the continuous melting and refining of anorganic compounds, especially glasses and glass ceramics

The invention relates to an apparatus for the continuous melting and refining of anorganic compounds, especially glasses or glass ceramics. Other substances can also be considered.

Numerous apparatuses have become known with which the said materials can be molten or refined, e.g. DE 33 16 546 C1. This concerns a so-called skull crucible with a cooled crucible wall and further with an induction coil which encloses the crucible and can be coupled into the crucible content by way of high-frequency energy. It allows bringing the crucible content to exceptionally high temperatures which reach up to 3000°C.

The advantage of high-frequency heating is that the crucible wall can be considerably colder than the glass melt. The cooling of the crucible wall can be performed through heat dissipation or active air or water cooling. In the skull crucible, a cold crust of generic material is formed in the wall zone. This crust has very low electric conductivity due to the lower temperature. That is why it does not absorb any high-frequency energy and forms a stable generic crucible. It thus allows reaching virtually any high melt temperature. It must merely be ensured through sufficient cooling that the generic wall is maintained (see EP 0 079 266 for example).

The melting process must usually be followed by a refining process. The refining is usually employed to free the molten glass of physically and chemically bound gases. The refining process is supported by special refining agents such as NaCl for example. The refining agents make a contribution in the respect that sufficiently large gas bubbles can form into which the residual gases from the melt can diffuse.

Lately, the demand has increasingly been made to operate the process of melting on the one hand and the process of refining on the other hand in a continuous way. WO 92 15531 describes an apparatus in which the melting and the refining occur in one and the same crucible. The two processes cannot be controlled independent from one another, which has an adverse effect on the glass quality.

The apparatus can merely be used for producing glasses with lower requirements placed on the quality. Moreover, the refining in this apparatus shows low effectiveness because cold starting material is continuously re-supplied in the surface area of the melt and the surface will always be the coldest part in the crucible.

US 4 780 121 describes an apparatus in which a first vessel is provided in which the mixture is molten and a second vessel in which the refining of the molten glass mass is performed. The glass melt as produced in the melting crucible is supplied from above to the refining vessel. The ceramic refining vessel is enclosed by an induction coil by means of which high-frequency energy can be coupled into the refining vessel. As a result of the ceramic refining crucible, the generation of high temperatures in the refining vessel is limited. The result of the refining is unsatisfactory in this apparatus. Even after the refining gas remains in the glass melt, namely to an extent which impairs the quality of the end product in an unacceptable manner.

A further disadvantage of this apparatus is the following: In order to enable the apparatus to be operated continuously, the throughput through the melting crucible must be as high as the throughput through the refining vessel. The progress of the processes in the two vessels is subject to different parameters, however. Accordingly, the temperature in the refining vessel must be adjustable to the refining process. It can thus not be

chosen freely. The method which can be performed with this method comes with the disadvantage that a regulation of the glass flow is not possible. The glass level can only be influenced by changing the outlet opening in the melting unit. A regulation or even only a control of the glass flow from the HF zone to a conditioning tank independent of the refining temperature is not possible. The discharge speed depends on the temperature in the HF crucible zone. If the temperature changes in the HF zone, the discharge increases due to the low viscosity of the melt. As a result, dramatic limitations concerning the possibilities of temperature variation are thus predetermined. Higher temperatures in the refining zone can at best be set in combination with a throughput increase. As a result, the advantage of improved refining by increasing the temperature is destroyed by the lower dwell time. Moreover, the free glass fall into an HF refining section leads to the disadvantage that bubbles can be shot in. Such shot-in air bubbles contain high shares of nitrogen and can thus be refined only with difficulty. This problem applies even more in the transfer from the HF zone to the homogenization zone. Bubbles that are shot in here are no longer able to leave the melt because no refining is performed here.

The invention is based on the object of providing an apparatus in which the melting on the one hand and the refining on the other hand are each performed in a separate vessel, which can further be operated in continuous operation, and in which the refining in particular leads to a perfect result, i.e. to a substantial degassing.

This object is achieved by the features of claim 1.

The inventors have recognized the following:
As explained above, the refining vessel is provided downstream of the melting vessel in the apparatus according to US 4 780 121 and it is

disposed below the same. The liquid melt thus flows into the refining vessel in free fall. The incoming melt is thus relatively cold. The surface of the content of the refining vessel is thus continuously formed by in-flowing cold melt. The major part of the cold and thus heavy glass melt flows into the middle of the refining crucible and rapidly to its outlet. The degassing occurs in the floor zone of the refining vessel, however, because heating by the induction coil can become effective there to a higher extent that in the surface zone. The gas bubbles are thus formed in the floor zone. Although they rise upwardly, the gas bubbles are prevented from continuing to rise and leave the melt by the relatively high viscosity of the cold layers in the top level zone. This means that gas remains to an undesirable extent in the melt contained in the refining vessel.

These disadvantages are avoided by the invention. The relatively cold melt emerges from the lower zone of the melting vessel, is introduced in the floor of the refining vessel and heated there by HF energy. Bubbles are formed by the gases contained in the melt. The bubbles rise upwardly. Since the upper layers of the melt are relatively hot and are thus of lower viscosity, the gas bubbles are able to leave the melt with ease.

The application of the invention allows bringing the content of a high-frequency heated skull crucible without a ceramic internal crucible to temperatures in the magnitude of 2400°C to 2600°C, and even to 3000°C. This is particularly important during the refining. The glass is relieved of physically and chemically bound gases in this process. The refining process is supported by refining agents such as Na_2So_4, As_2O_3, Sb_2O_3 or NaCl. These refining agents decompose or evaporate at refining temperature and form bubbles into which the residual gases from the melt can diffuse. The refining bubbles must be sufficiently large in order to rise within economically viable intervals to the surface of the glass melt and burst there. In the mentioned high temperatures which are achieved by the

invention, the rising speed is very high. The rising speed increases in the case of a temperature rise from 1600°C to 2400°C by a factor of 100. A bubble with a diameter of 0.1 mm thus rises at a temperature of 2400°C as fast as a bubble with a diameter of 1 mm at a temperature of 1600°C.

The physical and chemical solubility is reduced in most gases by an increase of the refining temperature and thus the high-temperature refining is supported.

As an alternative to increase the rising speed of bubbles and thus to reduce the refining time, the addition of refining agents can be omitted to a more or less strong extent. The precondition is, however, that the rising gas can reach the surface and that the bubbles located at the surface will burst and that no foam will be formed.

The principle in accordance with the invention has a further advantage. Due to the fact that the melt flows into the refining vessel from below, namely in the floor zone, the jacket surface of the refining vessel is essentially free from connections. In this way the induction coil can be arranged in an unobstructed way and without having to take any spatial considerations into account such that it encloses the jacket surface of the refining vessel at will, as is desirable under the aspect of optimal coupling-in of high-frequency energy.

The invention is now explained in closer detail by reference to the drawing.

A melting vessel 1 is shown. It is arranged as a walled trough made of ceramic material. A connecting line 2 is used to supply the glass melt produced in the melting vessel 1 to a refining vessel 3. The refining vessel 3 is associated with an induction coil 5. The induction coil 5 encloses the

refining vessel 3 in a manner that the windings of coil 5 enclose the vertical axis of the refining vessel 3 in a substantially concentric way.

A horizontal groove 4 is connected to the refining vessel 3. It is used for cooling the melt. The cooling is performed here from high temperatures, e.g. from the range of 2400 to 3000°C to a temperature of 1600°C. The cooling groove can consist either of a stone or ceramic groove which is air or water-cooled, or of a high-frequency heated skull groove. A post-refining and the resorption of the residual bubbles can be made in the cooling groove.

A stirring crucible 6, with a stirrer 6.1, is disposed at the end of the groove for homogenizing the melt. The melt is taken from the stirring crucible 6 via a feeder 6.2 in order to be supplied to the shaping process. The groove 4 is associated with a glass level gauge 7 with which the geodetic height of the level of the glass melt in the groove 4 can be detected.

The melting in the melting vessel 1 can be performed both electrically as well as with burners or by a combination of the two means. The so-called raw melt occurs in the zone of the melting vessel.

The connecting line 2 consists either of a resistance-heated platinum pipe or of refractory material. If the connecting line 2 consists of refractory material, then glass melt is heated directly by using electrodes. Alternatively, the heating can also be performed from the outside.

As is shown, the connecting line 2 is connected in the lower zone to the melting vessel 1. It passes through the floor 3.1 of the refining vessel 3 into the same. The glass leak-proofness at the connecting point is achieved by an annularly arranged water or air cooling. This seal, which usually consists of platinum, is also simultaneously used as a high-frequency screen. It is

electrically shunted to ground potential. This prevents high-frequency leakage radiation from being led out of the high-frequency zone through the connecting line 2 and through the electrodes to where the open-loop and closed-loop control of other electric components can be disturbed. If necessary, glass sealing and electric grounding can be installed separately from one another.

The refining vessel 3 per se is arranged modularly and thus very flexibly. It consists of several segments with meandering water-cooled copper or stainless steel pipes. The segments are electrically short-circuited in the floor zone in order to prevent the formation of any arcs between the segments at very high melt temperatures. This can occur for example when the insulation crust of the generic material becomes very thin. A short circuit is also possible in the upper zone of the refining vessel 3. Disadvantageous is the displacement of the high-frequency field to the lower zone of the refining vessel, because this can lead to a cooling of the melt surface.

At refining temperatures of up to 1650°C, the refining tank can also consist of a ceramic material. The high frequency must not couple into the ceramic material because otherwise the tank would be molten by the high frequency. Ceramic tanks have the disadvantage that, as a result of heat radiation, the air between the tank and the high-frequency coils can heat up to such an extent that an arc-over may occur. The skull crucible is usually more advantageous for refining temperatures of over 1650°C because in this way the crucible wall can be cooled intensively by water- or air-cooled metal pipes. Virtually any desired high refining temperature can be achieved with the skull crucible because the maximum refining temperature is not limited by crucible corrosion.

The melting volume of the refining crucible 3 is chosen in such a way that the dwell time for the required refining result is just sufficient. Any over-dimensioning must be avoided from an energetic point of view. The cooling of the thus linked larger wall losses must be compensated by additional high-frequency output. It has been seen for alumosilicate glasses for example, that for the refining, a dwell time of 30 to 60 minutes at refining temperatures of 2200°C for example is sufficient.

The melting vessel is walled with refractory material, as explained above. Instead, it could also be arranged as a skull crucible. In this case it has the same structure as the refining vessel with an induction coil for coupling-in high-frequency energy into the content of the vessel, as described here.

As a result of the arrangement according to the principle of interconnected pipes, the regulation of the glass level is very simple. The measurement of the glass level is performed in the conventional melt zone of the groove (shortly before the stirrer). Since all components are connected with one another, the glass level in the entire melting unit is known. The measured variable from the tank end can be used for controlling the entire glass level, from the melting tank, via the HF refining section up to the groove.

This simple control of the glass level is possible because it has been managed here to integrate the HF refining section in the system of the tank as an interconnected component. The throughput can be regulated completely independent of the HF refining temperature and the viscosity in the refining unit.

At the end of the groove there is a stirring crucible (6) for homogenizing the melt. The glass is taken from the tank via a feeder (7) and supplied to the shaping process.

The melting vessel (1) and/or the refining vessel (3) can be arranged within a conductive cage for protection from the re-radiation of the electromagnetic field produced by the high-frequency device.

AMENDED CLAIMS

1. An apparatus for the continuous melting and refining of anorganic compounds, especially glasses or glass ceramics;

1.1 with a melting vessel (1);

1.2 with a refining vessel (3) which is configured according to the skull principle;

1.3 with an induction coil (5) being associated with the refining vessel (3), which coil is used for coupling in a high-frequency energy into the vessel content and encloses the walls of the refining vessel (3);

1.4 with a connecting line (2) which is used for transferring the melt from the melting vessel (1) to the refining vessel;

1.5 with the connecting line (2) emerging from the floor zone of the melting vessel (1) and into the refining vessel in the floor zone of the same.

2. An apparatus as claimed in claim 1, characterized in that the connecting line (2) emerges laterally from the floor zone 1.1 of the melting vessel (1) and enters the refining vessel (3) through the floor 3.1 of the same.

3. An apparatus as claimed in claim 1 or 2, characterized in that a cooling groove (4) is provided downstream of the refining vessel (3).

4. An apparatus as claimed in claim 3, characterized in that the cooling groove (4) is provided downstream with a stirring crucible (6).

5. An apparatus as claimed in one of the claims 1 to 4, characterized in that the melting vessel (1) and/or the refining vessel (3) are disposed within a conductive screening cage.

6. A method for operation in an apparatus as claimed in one of the claims 1 to 5, characterized in that the melt is supplied continuously from the melting vessel (1) from below to the refining vessel (3) and flows in the upper zone via a cooling groove (4) to a stirring crucible (6).

7. A method as claimed in claim 6, characterized in that the melt level in the melting vessel (1), in the refining vessel (3), in the cooling groove (4) and in the stirring crucible (6) are at one and the same level in the manner of interconnected pipes.

8. A method as claimed in one of the claims 6 or 7, characterized in that the melting vessel (1) is made from ceramic stone material, of platinum or of a platinum alloy.

9. A method as claimed in one of the claims 6 to 8, characterized in that the melting vessel (1) consists of a so-called skull crucible and that the glass melt is heated in the melting vessel (1) by means of high frequency.

10. A method as claimed in one of the claims 6 to 9, characterized in that the connecting line (2) between the melting vessel (1) and the refining vessel (3) is made of a heatable platinum pipe or of a heatable stone groove.

11. A method as claimed in one of the claims 6 to 10, characterized in that the refining vessel (3) consists of a ceramic crucible and that the melt is heated in the refining vessel (3) by means of high frequency.

12. A method as claimed in one of the claims 5 to 11, characterized in that the refining vessel (3) consists of a skull crucible and that the melt is heated in the refining vessel (3) by means of high frequency.

13. A method as claimed in one of the claims 5 to 12, characterized in that the skull crucible is electrically short-circuited in the floor zone.

14. A method as claimed in one of the claims 5 to 13, characterized in that the melt is cooled in the cooling groove (4) from the refining temperature in the refining vessel (3) to 1500°C to 1550°C in the case of a platinum conditioning part (6) or to 1500°C to 1650°C in the case of a conditioning part (6) which is made of ceramic material.

15. A method as claimed in one of the claims 5 to 14, characterized in that the glasses to be refined are free of toxic refining agents such as As_2O_3 or Sb_2O_3.

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

(19) Weltorganisation für geistiges Eigentum
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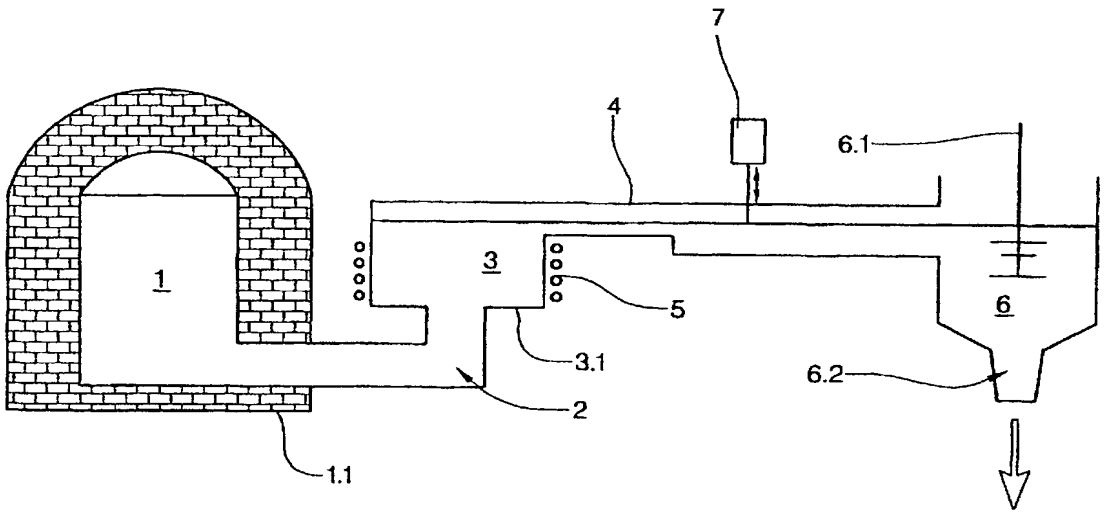
[Fortsetzung auf der nächsten Seite]

(54) Title: DEVICE FOR CONTINUOUSLY MELTING AND REFINING INORGANIC COMPOUNDS, ESPECIALLY GLASSES AND GLASS CERAMICS

(54) Bezeichnung: VORRICHTUNG ZUM KONTINUIERLICHEN ERSCHMELZEN UND LÄUTERN VON ANORGANISCHEN VERBINDUNGEN, INSBESONDERE VON GLÄSERN UND GLASKERAMIKEN



(57) Abstract: The invention relates to a device for continuously melting and refining inorganic compounds, especially fragments of glass or batches. The inventive device comprises a melting pot (1) and a refining pot (3). An induction coil (5) is allocated to the refining pot (3), serves for coupling high-frequency energy into the content of the pot and surrounds the wall of the refining pot. The inventive device also comprises a connection line (2) which serves for conveying the melt from the melting pot (1) into the refining pot (3). According to the invention, the connection line (2) exits the melting pot (1) in the bottom area (1.1) thereof and enters the melting pot in the bottom area (3.1) of the refining pot (3).

[Fortsetzung auf der nächsten Seite]

WO 01/14267 A1

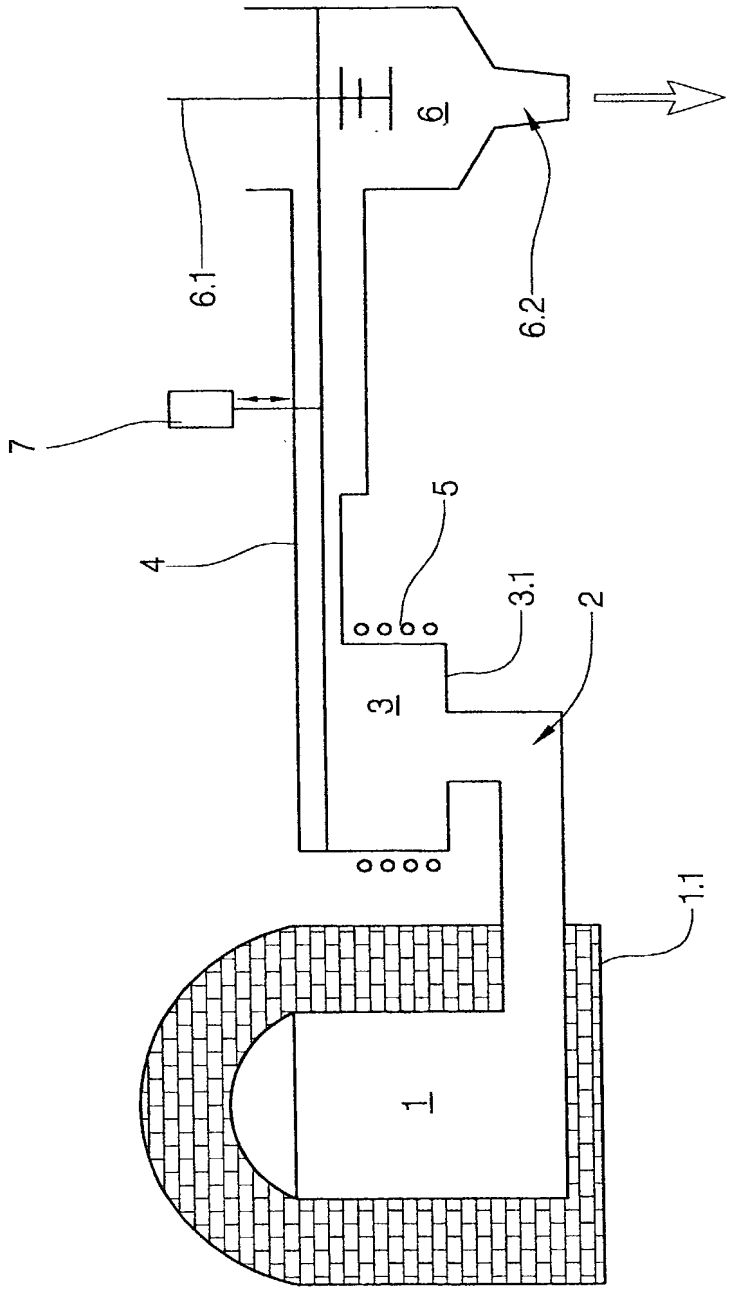


Fig.1

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Declaration and Power of Attorney for Patent Application
Erklärung für Patentanmeldungen mit Vollmacht

German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

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As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

DEVICE FOR CONTINUOUSLY MELTING AND REFINING INORGANIC COMPOUNDS, ESPECIALLY GLASSES AND GLASS CERAMICS

deren Beschreibung hier beigefügt ist, es sei denn (in diesem Falle Zutreffendes bitte ankreuzen), diese Erfindung

the specification of which is attached hereto unless the following box is checked:

☐ wurde angemeldet am _____ unter der US-Anmeldenummer oder unter der Internationalen Anmeldenummer im Rahmen des Vertrags über die Zusammenarbeit auf dem Gebiet des Patentwesens (PCT) _____ und am _____ abgeändert (falls zutreffend).

☒ was filed on August 8, 2000 as United States Application Number or PCT International Application Number PCT/EP00/07652 and was amended on _____ (if applicable).

Ich bestätige hiermit, daß ich den Inhalt der oben angegebenen Patentanmeldung, einschließlich der Ansprüche, die eventuell durch einen oben erwähnten Zusatzantrag abgeändert wurde, durchgesehen und verstanden habe.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

Ich erkenne meine Pflicht zur Offenbarung jeglicher Informationen an, die zur Prüfung der Patentfähigkeit in Einklang mit Titel 37, Code of Federal Regulations, § 1.56 von Belang sind.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federa Regulations, § 1.56.

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I hereby claim foreign priority under Title 35, United States Code, §119(a)-(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Applications
(Frühere ausländische Anmeldungen)

(Number) (Nummer)	(Country) (Land)	(Day/Month/Year Filed) (Tag/Monat/Jahr der Anmeldung)	Priority Not Claimed Priorität nicht beansprucht
199 39 779.1	Germany	21 August 1999	☐
			☐

Ich beanspruche hiermit Prioritätsvorteile unter Title 35, US-Code, § 119(e) aller US-Hilfsanmeldungen wie unten aufgezählt.

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(Application No.) (Aktenzeichen)	(Filing Date) (Anmeldetag)

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(Application No.) (Aktenzeichen)	(Filing Date) (Anmeldetag)	(Status) (patented, pending, abandoned) (Status) (patentiert, schwebend, aufgegeben)
EP00/07652	8 August 2000	Published

Ich erkläre hiermit, daß alle in der vorliegenden Erklärung von mir gemachten Angaben nach bestem Wissen und Gewissen der Wahrheit entsprechen, und ferner daß ich diese eidesstattliche Erklärung in Kenntnis dessen ablege, daß wissentlich und vorsätzlich falsche Angaben oder dergleichen gemäß § 1001, Title 18 des US-Code strafbar sind und mit Geldstrafe und/oder Gefängnis bestraft werden können und daß derartige wissentlich und vorsätzlich falsche Angaben die Rechtswirksamkeit der vorliegenden Patentanmeldung oder eines aufgrund deren erteilten Patentes gefährden können.

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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith: *(list name and registration number)*

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